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stellar orbit, have passed, and may yet have to pass, through regions of space, in which the light-yielding element may either abound or be deficient, and so cause him to beam forth with increased splendour, or fade in brilliancy, just in proportion to the richness or poverty of this supposed light-yielding element as may occur in those regions of space through which our sun, in common with every stellar orb, has passed, is now passing, or is destined to pass, in following up their mighty orbits.

"Once admit that this light-yielding element resides in *space*, and that it is *not* equally diffused, we may then catch a glimpse of the cause of the variable and transitory brightness of stars, and more especially of those which have been known to beam forth with such extraordinary splendour, and have again so mysteriously faded away; many instances of which abound in historical record.

"Finally, in reference to such a state of change having come over our sun, as indicated by the existence of a glacial period, as is now placed beyond doubt by geological research, it appears to me no very wild stretch of analogy to suppose that in such former periods of the earth's history our sun may have passed through portions of his stellar orbit in which the light-yielding element was deficient, and in which case his brilliancy would have suffered the while, and an arctic climate in consequence spread from the poles towards the equator, and leave the record of such a condition in glacial handwriting on the everlasting walls of our mountain ravines, of which there is such abundant and unquestionable evidence. As before said, it is the existence of such facts as we have in stars of transitory brightness, and the above-named evidence of an arctic climate existing in what are now genial climates, that renders some adequate cause to be looked for. I have accordingly hazarded the preceding remarks as suggestive of a cause, in the hope that the subject may receive that attention which its deep interest entitles it to obtain.

"This view of the source of light, as respects the existence of the luciferous element throughout space, accords with the Mosaic account of creation, in so far as that light is described as having been created in the first instance *before the sun* was called forth."

Note by the Astronomer Royal.

"In an oral address to the Society, on 1849, December 14, an abstract of which is printed in the *Monthly Notices*, vol. x. No. 2, in describing the method of recording transits by the agency of a galvanic current, I ascribed certain steps of the invention to Dr. Locke and Professor Mitchell. I have lately been informed that the invention was also shared by Mr. Bond, Mr. Walker, and perhaps by other persons. I am desirous of explaining to the Society that the history, such as I gave it at that time, was founded upon the printed papers which had then reached me, and upon my correspondence with American friends; both necessarily im-

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perfect sources of information; and that I had no wish to assert the claims of Messrs. Locke and Mitchell further than as they seemed to be implied in those documents, nor to express any opinion on the claims of others, either to the first idea or to the subsequent steps of the invention."

Description of the Apparatus for observing Transits, by means of a Galvanic Current, now used at the Observatory of Cambridge, U.S. By Mr. G. P. Bond.*

The apparatus exhibited to the Society, is the same which has been for some time past in use at the Harvard Observatory, U.S., and is the property of the United States Coast Survey. It consists of an electric break-circuit clock, a galvanic battery of a single Grove's cup, and the spring governor, by which a uniform motion is given to the cylinder carrying the paper.

The electric clock is of the form proposed by Mr. Bond. Though different in its object and construction, the effect produced is the same with that of the clock proposed by Professor Wheatstone, namely, the interruption of the galvanic circuit at intervals of a second. The pallets and the escapement-wheel are insulated, both from the pendulum and from the other wheels. When the battery is in connexion, the circuit is broken by the pallet leaving the tooth of the wheel, and is restored at the instant of the beat of the clock, which is in fact the sound produced by the completion of the contact restoring the circuit: the passage of the current being through the pallet and the escapement-wheel alone. With the exception of the connecting wires, and the insulation of some parts, the clock is like those in common use for astronomical purposes.

Two wires pass from the clock, one direct to the battery, and the other, through the break-circuit-key used by the observer, and through the recording magnet, back to the battery. The length of wire is of course immaterial.

The magnet, with a slight difference in the form of the armature, is the same with those used on Morse's telegraph lines in the United States. The armature carries a glass pen, supplied with ink from a small reservoir. Under this pen the paper revolves on which the records are made. The breaking of the circuit by the clock, every second, is marked by an offset made by the pen, and the breaking of the circuit by the observer, is similarly recorded between the second marks of the clock. The paper is wound upon a cylinder, as suggested by Mr. Saxton of Washington. Unless a motion perfectly uniform is given to the cylinder, the second marks at the end of an hour, instead of being arranged in regular straight lines upon the paper, will change their relative positions, and the record become so confused as to make it a most serious undertaking to read off the observations after they have been taken.

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* This is the substance of a lecture delivered by Mr. Bond, in which the whole *modus operandi* was clearly shown.

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